IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Liwen Xu et al.

Serial Number: 10/605,930 Group Art Unit: 3661

Filed: 11/06/2003 Examiner: Nguyen, Tan Quang

For: ROLL STABILITY CONTROL SYSTEM FOR AN AUTOMOTIVE VEHICLE USING AN EXTERNAL ENVIRONMENTAL SENSING SYSTEM

Attorney Docket Number: 81044242 (FGT 1865 PA)

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Date: 10-13-2006 Donna Kraft

APPEAL BRIEF

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Sir:

The present Appeal Brief is being submitted pursuant to the Notice of Appeal dated August 11, 2006 for the above-identified patent Application.

I. Real Party in Interest

The real party in interest in this matter is Ford Global Technologies, LLC, which is a wholly owned subsidiary of Ford Motor Company, both in Dearborn, Michigan (hereinafter "Ford").

II. Related Appeals and Interferences

There are no other known appeals or interferences which will directly affect or be directly affected by, or have any bearing on, the Board's decision in the pending appeal.

III. Status of the Claims

Claims 1-35 currently stand rejected by Examiner in the Office Action dated June 15, 2006 and marked "final." Claims 36-160 have previously been withdrawn from consideration. At the present time, therefore, Examiner's rejection of claims 1-35 is being appealed herein.

IV. Status of Amendments

No amendments have been filed after the aforementioned final Office Action.

V. Summary of Claimed Subject Matter

In Appellants' patent application, independent claim 1 is best understood with reference to Figures 2 and 4; the Abstract; and paragraphs 0030, 0034-0035, 0044, 0046, 0049, 0059, and 0062-0064 of the specification. In general, claim 1 sets forth a control system for an automotive vehicle. As presently set forth in claim 1, the control system includes: (i) a camera-based vision system for generating image signals; (ii) a rollover control system; and (iii) a controller coupled to both the camera-based vision system and the rollover control system. In this configuration, the controller is operable to generate a dynamic vehicle characteristic signal in response to the image signals. In response to the dynamic vehicle characteristic signal, the controller is operable to control the rollover control system.

Also in Appellants' application, independent claim 21 too is best understood with reference to Figures 2 and 4; the Abstract; and paragraphs 0030, 0034-0035, 0044, 0046, 0049, 0059, and 0062-0064 of the specification. In general, claim 21 sets forth a method of controlling a rollover control system for an automotive vehicle. As presently set forth in claim 21, the method includes the steps of: (i) generating an image signal; (ii) generating a dynamic vehicle characteristic signal in response to the image signal; and (3) controlling the rollover control system in response to the dynamic vehicle control signal.

VI. Grounds of Rejection to be Reviewed on Appeal

The following six issues are presented in this appeal.

1. Are claims 1-10 and 14-16 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Patent Number 6,757,595, issued to Geoffrey Bauer (hereinafter "Bauer"), in view of United States Patent Number 6,535,114, issued to Toshihiko Suzuki *et al* ("Suzuki")?

2. Are claims 11-13 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of United States Patent Number 6,169,946, issued to Robert Griessbach ("Griessbach")?

3. Are claims 17-19 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of United States Patent Number 6,292,111, issued to Naoto Ishikawa *et al* ("Ishikawa")?

4. Is claim 20 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of United States Patent Number 5,913,375, issued to Masao Nishikawa ("Nishikawa")?

5. Are claims 21-29 and 33-35 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki?

6. Are claims 30-32 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of Griessbach?

VII. Arguments

1. Claims 1-10 and 14-16 improperly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki.

Claims 1-10 and 14-16:

In the final Office Action, claims 1-10 and 14-16 all stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki. For the reasons set forth hereinbelow, Appellants respectfully maintain that such rejections are improper.

Claim 1 recites a control system for an automotive vehicle that includes a camera-based vision system, which generates image signals. The control system also includes a rollover control system and a controller that is coupled to the camera system and the rollover control system. The controller generates a dynamic vehicle characteristic signal in response to the image signals. The controller controls the rollover control system in response to the dynamic vehicle characteristic signal.

The Office Actions to date state that Bauer suggests that a roll parameter is typically estimated from available sensors. The Office Actions also state, however, that Bauer fails to disclose a camera-based vision system for generating a roll angle. Appellants submit that up until their proposed invention as presently recited in claims 1-10 and 14-16, sensors utilized to determine a roll parameter onboard a vehicle have not included cameras as in Appellants' proposed invention. Instead, prior to Appellants' invention, non-vision based angular rate sensors or acceleration sensors, such as gyro sensors or accelerometers, have generally been exclusively used onboard a vehicle to detect its global attitude. In general, such sensors are largely directed to the status of a vehicle itself with little to no regard to the vehicle's surroundings. In contrast, Appellants' invention utilizes onboard cameras as sensors to facilitate detection of a vehicle's true angular position relative to its surroundings. Appellants are aware that independent claim 1 does not explicitly state that a vehicle's relative angular position is detected, but specific recited use of a camera as well as the generation of an image signal for rollover control in these claims allow for such relative detection to be read into these claims. Appellants maintain that reading independent claim 1 in this manner is reasonable

given the subject matter set forth in dependent claims 12 and 13. In sum, therefore, the control system set forth in independent claim 1 facilitates the determination of a vehicle's true angular position relative to its surroundings, which thereby helps improve roll stability control of the vehicle.

The mere statement that "available sensors" may be used, as recited in Bauer (column 3, lines 45-60), does not infer the use of cameras as provided by Appellants' proposed invention. That is, until Appellants' invention, a vehicle's true angular position relative to its surroundings was generally not determined and could not be determined using typical sensors. Instead, a vehicle's angular position was previously only estimated. See the Background section of Appellants' present application for a more thorough explanation.

The Examiner provides the Suzuki reference to suggest that the use of cameras onboard a vehicle would have been obvious. Appellants, however, respectfully traverse such a suggestion. In particular, although Suzuki teaches the use of a single camera onboard a vehicle, the camera is primarily used for detecting obstacles and/or small objects. In Suzuki, more conventional sensors are utilized to detect the roll, yaw, and pitch of the vehicle on which the camera is mounted. Equipped as such, the system taught by Suzuki primarily tracks a surrounding object using an image received from the onboard camera in response to the roll, yaw, and pitch information. The system of Suzuki provides improved object tracking onboard a vehicle by taking into account the motion of the vehicle and thus the motion of the camera. The camera taught in Suzuki is generally not used to detect, generate, or determine a roll parameter. There generally is no suggestion in Suzuki for the use of a camera to detect a roll parameter.

The aforementioned final Office Action states that Suzuki suggests a system and method for optically monitoring the environment of a moving vehicle, which includes a camera for generating a roll parameter for use in controlling the engine, brakes, transmission, steering, etc. Appellants submit that the roll parameter is not generated in response to the signal received from the camera, but rather from other onboard sensors. The roll parameter is used in understanding the information received from the camera. Also, in Suzuki, the roll parameter generated is not used to prevent or mitigate vehicle body roll motion, but rather is used to provide better object tracking to avoid obstacles.

In view of the above, Appellants herein maintain that Suzuki is unrelated and is non-analogous art for purposes of rendering Appellants' proposed invention obvious. Referring to M.P.E.P. chapter 2141.01(a), while the Patent Office classification of references and cross-references in the official search notes are some evidence of "nonanalogy" or "analogy" respectively, at least one court has found that "the similarities and differences in structure and function of the inventions to carry far greater weight." *In re* Ellis, 476 F.2d 1370, 1372, 177 U.S.P.Q. 526, 527 (CCPA 1973). Though Appellants are presently unsure of the particular classification of their proposed invention, they do note that the classification of Suzuki is different than the classification of Bauer, which at least suggests that Suzuki is non-analogous art. Furthermore, Appellants also submit that the structure, function, and purpose of the system taught by Suzuki are significantly different than those of Appellants' proposed invention. In particular, Suzuki primarily discloses an object-tracking system as opposed to a true rollover stability control system. Thus, Suzuki would not have logically come to an inventor's attention when considering the problems solved by the system and method claimed by Appellants. That is, in developing a rollover stability control system for a vehicle, one would generally not look to a technique for improved object tracking to develop such. In view of the above, therefore, Appellants respectfully submit that Suzuki is non-analogous art and that to use such as a reference for obviating Appellants' proposed invention is improper.

Thus, for the above-stated reasons alone, it would not have been obvious to combine and modify Suzuki with Bauer to arrive at Appellants' proposed invention. Also, there is no motivation or suggestion in either of the references for the combination thereof as well as modifications needed to arrive at Appellants' invention.

Furthermore, Appellants submit that neither of the Bauer and Suzuki references alone, or in combination with each other, teaches a controller that generates a dynamic vehicle characteristic signal in response to camera image signals and that controls a rollover control system in response to the dynamic vehicle characteristic signal, as required in Appellants' claim 1. Not only is the use of such a camera-based system not taught by the relied upon art, Bauer in particular merely describes a system that limits a rollover "propensity" in an automotive vehicle. Furthermore, Bauer does not disclose or suggest a system for controlling a vehicle during a rollover situation or a rollover controller, as recited in Appellants' independent claim 1. Instead, Bauer merely suggests that the tendency to rollover will be reduced through the operation of its system and method. In the final Office Action, Examiner indicates that the

system and method for reducing rollover in Bauer is equivalent to Appellants' rollover controller since it controls the rollover. An actual rollover, however, is not controlled in Bauer. Instead, Bauer simply minimizes body roll motion or oscillations prior to a potential rollover or a rollover event.

In Appellants' Amendment dated April 13, 2006, the Appellants submitted that Bauer does not address any sort of remote sensors for use in its stability control system. Examiner has responded by stating that remote sensors are not claimed. Appellants, however, in stating the term "remote sensors" were referring to the cameras, which are used to monitor an area external or remote from a vehicle or, for example, the road in front of a vehicle.

Referring to M.P.E.P. chapters 706.02(j) and 2143, in order to establish a *prima facie* case of obviousness, the prior art reference(s) must teach or suggest all claim limitations in a proposed invention. See *In re* Vaeck, 947 F.2d 488, 20 U.S.P.Q. (2d) 1438 (Fed. Cir. 1991). Therefore, since each and every limitation of Appellants' claim 1 is not taught or suggested by the references relied upon by Examiner, Appellants respectfully maintain that claim 1 is nonobvious and thus in condition for allowance. Furthermore, since Appellants' claims 2-10 and 14-16 are dependent on independent claim 1, these dependent claims are also believed to be nonobvious and in condition for allowance.

Moreover, with particular regard to Appellants' independent claim 1, it is important to note that the "camera-based vision system [for] generating image signals" set forth therein must necessarily be interpreted as comprising *two or more cameras*. Appellants maintain that such an interpretation of claim 1 is clear from the specification of Appellants' application. See also Figure 2. For example, in paragraph 0034 of the specification, it is stated that

> "[c]ontroller 26 may also be coupled to a *camera system* 43 having *cameras* 43a-43e. A stereo pair of cameras [43a, 43b] may be mounted on the front of the vehicle .... Camera 43c may be mounted on the right side of the vehicle, camera 43d may be mounted on the left side of the vehicle, and camera 43e may be directed rearward of the vehicle. *All or some of the cameras may be used in a commercial embodiment.* Also, [the] stereo pair of cameras 43a, 43b may be replaced by a single camera (43a or 43b) ...."

In addition, in paragraph 0049 of Appellants' specification, it is stated that

> "[r]eferring now to FIG. 7, a perspective view of a field of view of one or both of the front cameras is illustrated. Similar views would be available to the side cameras. Similar views would also be generated from the rear camera. Many of the calculations from the front camera may be performed by the rear camera. *Based on various [visual] cues, various dynamic conditions* such as the roll angle, vehicle speed, body-to-road angle, longitudinal and lateral velocities, pitch angle, road departure, an in-path object, wheels lifting, and body slides ... *may be determined. The front, rear, side, and front or rear and a side camera may be used to obtain the points or visual cues* ...."

Furthermore, Appellants' dependent claims 17-19 indicate that the "camera system" of independent claim 1 comprises two cameras. In sum, therefore, the "camera-based vision system" or "camera system" set forth in Appellants' claim 1 should thus be interpreted to have at least two cameras in total, though two cameras need not necessarily be particularly mounted on the front of the vehicle in any given "camera system." By having two or more cameras in each onboard camera system as proposed by Appellants, the various and multiple visual cues provided by the cameras thereby facilitate improved determination of various dynamic conditions and thus improved rollover control of the vehicle.

In contrast, however, Bauer and Suzuki, either individually or in combination with each other, neither teach nor suggest such a multi-camera vision system. Although Bauer does acknowledge and teach the use of multiple "sensors" in a vehicle stability/rollover system, *Bauer does not teach the use of any cameras or vision systems.* Instead, Bauer only specifically mentions onboard sensors such as, for example, a speed sensor, a steering angle sensor, a brake pressure sensor, or an accelerometer. (Bauer, see column 1, lines 15-26; column 3, lines 45-60; and column 4, lines 29-47). Examiner acknowledged such in the final Office Action by stating, "Bauer does not disclose a camera-based vision system for generating a roll angle." (See second sentence in paragraph 2 of final Office Action dated 06/15/2006). In addition, though Suzuki acknowledges past proposals of various multi-camera vision systems onboard vehicles, *Suzuki specifically teaches away from the use of multi-camera vision systems onboard a vehicle.* In particular, Suzuki specifically teaches that a stereo vision system "requires a plurality of cameras, which is disadvantageous considering necessary space and cost."

(Suzuki, see column 1, lines 29-36). Furthermore, Suzuki argues that some onboard stereo vision systems even require "more than three cameras ... to better ensure reliable results[,]" which consequently "may restrict the possible camera installation positions and ... reduce the range of camera field of view allowed for use." (Suzuki, see column 1, lines 37-45). In view of such, *Suzuki exclusively teaches use of only a "single camera" onboard a vehicle* for "object/obstacle recognition" and "vehicle control." (Suzuki, see column 1, lines 45-53; column 2, lines 40-63; column 4, lines 45-67; column 5, lines 1-6 and 56-62; column 7, lines 40-47; column 12, line 50-52; column 17, lines 11-16; column 18, lines 48-67; column 19, lines 5-6; column 21, lines 42-43; column 22, lines 4-5 and 40-41; Abstract; and Figures 1, 2, 4B, 6, 7B, and 11).

In view of the above, Appellants respectfully maintain that Bauer and Suzuki, either alone individually or in combination with each other, neither teach nor suggest a vehicle "control system" having a multi-camera "vision system" as set forth in Appellants' independent claim 1. That is, Appellants maintain that Bauer does not teach the use of any cameras or vision systems onboard a vehicle, and Suzuki teaches exclusive use of only a single onboard camera while specifically teaching against use of multiple onboard cameras. Therefore, Appellants respectfully aver that independent claim 1 is not rendered obvious by Bauer and Suzuki. Furthermore, since claims 2-10 and 14-16 are dependent on independent claim 1, Appellants also respectfully aver that claims 2-10 and 14-16 are not rendered obvious by Bauer and Suzuki as well.

2. Claims 11-13 improperly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of Griessbach.

Claims 11-13:

Also in the final Office Action, claims 11-13 all stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further in view of Griessbach. For the reasons set forth hereinbelow, Appellants respectfully maintain that such rejections are improper.

In the final Office Action, Examiner indicates that Bauer and Suzuki do not teach a "wheel lifted signal," as set forth in Appellants' claim 11. (See first sentence in paragraph 15 of

final Office Action dated 06/15/2006). Appellants agree and submit that Bauer and Suzuki also fail to teach a "body-to-road angle signal," as set forth in Appellants' claim 12. Furthermore, Appellants also submit that Bauer and Suzuki fail to teach a controller that "enters a wheel lift determination when a body-to-road angle signal is above a predetermined threshold," as required in Appellants' claim 13. In the same Office Action, Examiner also indicates that Griessbach discloses a "wheel lifted signal," but Examiner is completely silent with regard to the claimed limitations of a "body-to-road angle signal" and a "wheel lift determination," as set forth in Appellants' claims 12 and 13. In view of such, therefore, Appellants maintain that claims 12 and 13 have been improperly rejected by Examiner.

In general, Griessbach is directed to accident protection via a triggering device, such as a rollbar. Griessbach is not directed to roll stability control. In Griessbach, transverse acceleration and tilt of a vehicle are monitored, and based thereon the rollbar is actuated. Although Griessbach teaches the monitoring of a roll angle, Appellants maintain that such a teaching does not suggest that wheel lift is monitored. Wheel lift is different than roll angle. Roll angle may change while wheel lift remains constant and vice versa. Thus, not only does Griessbach fail to disclose the additional limitations of dependent claims 11-13, Appellants submit that Griessbach is also non-analogous art. In particular, Appellants maintain that a rollbar triggering system is substantially different than a rollover stability control system. That is, a rollbar triggering system is utilized to deploy or actuate a rollbar for occupant protection. A rollover stability control system, in contrast, is utilized to prevent a vehicle from rolling over. Thus, for these reasons, Appellants respectfully maintain that Griessbach together with Bauer and Suzuki does not render Appellants' claims 11-13 obvious.

Furthermore, Griessbach neither teaches nor suggests a multi-camera "vision system" included within a control system onboard a vehicle, as is required in Appellants' independent claim 1. Since Bauer and Suzuki also fail to teach such a multi-camera vision system as required in Appellants' claim 1 (see Argument to Issue 1 hereinabove), Appellants for this reason too maintain that claims 11-13 are nonobvious in addition to claim 1, for claims 11-13 are dependent on independent claim 1.

Moreover, there is no motivating suggestion in Bauer, Suzuki, or Griessbach for their combination and the needed modification thereof to arrive at Appellants' present invention. Thus, Appellants' claims 11-13 should be deemed nonobvious for this reason as well.

3. Claims 17-19 improperly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of Ishikawa.

Claims 17-19:

In the final Office Action, claims 17-19 all stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of Ishikawa. For the reasons set forth hereinbelow, Appellants respectfully maintain that such rejections are improper.

In the final Office Action, Examiner acknowledges that Bauer and Suzuki do not teach a *multi-camera* vision system as required in Appellants' claims 17-19, but Examiner does indicate that Ishikawa suggests such a multi-camera vision system. (See paragraph 17 of final Office Action dated 06/15/2006). Appellants, however, disagree with Examiner, for *Ishikawa only teaches the use of one "video camera" onboard a vehicle.* (Ishikawa, see column 1, lines 8-22, 35-42, 47-52; column 3, lines 64-67; column 8, lines 29-31 and 54-57; column 9, lines 13-23; column 10, lines 5-38; column 12, lines 10-27; and Figures 2 and 13). In view of such, Appellants respectfully maintain that Appellants' claims 17-19 are not rendered obvious by any combination of Bauer, Suzuki, and Ishikawa.

Furthermore, Appellants submit that Ishikawa is non-analogous art. Ishikawa's being non-analogous art may be inferred by the different classification of Ishikawa and is supported by the difference in structure and function with respect to Appellants' present invention. Ishikawa is directed to a vehicle exterior monitoring system. Ishikawa particularly uses a single video camera to detect objects and target vehicles, and in response thereto, alarms a driver of such objects. Also, Ishikawa is not directed to rollover stability. The system, method, and controller taught by Ishikawa are all different than that claimed by Appellants, and use of a video camera as taught by Ishikawa is different than the camera use claimed by Appellants as well.

4. Claim 20 improperly stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of Nishikawa.

Claim 20:

Also in the final Office Action, claim 20 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of Nishikawa. For the reasons set forth hereinbelow, Appellants respectfully maintain that such rejections are improper.

In particular, Nishikawa neither teaches nor suggests a multi-camera "vision system" included within a control system onboard a vehicle, as is required in Appellants' independent claim 1. Instead, *Nishikawa only teaches use of a single camera onboard a vehicle.* (Nishikawa, see column 6, lines 35-40; column 7, lines 15-18; column 25, lines 1-17; Abstract; and Figures 1 and 3). Since Bauer and Suzuki also fail to teach such a multi-camera vision system as required in Appellants' claim 1 (see Argument to Issue 1 hereinabove), Appellants for this reason maintain that claim 20 is nonobvious in addition to claim 1, for claim 20 is dependent on independent claim 1.

Furthermore, Appellants submit that Nishikawa is non-analogous art. Nishikawa's being non-analogous art may be inferred by the different classification of Nishikawa and is supported by the difference in structure and function with respect to the Appellants' present invention. Nishikawa is directed to a steering correction system. Nishikawa uses an onboard CCD camera to monitor the condition of the road ahead of a vehicle and performs steering corrections in response thereto. Nishikawa is not directed to rollover stability. The system, method, and controller of Nishikawa are all different than that claimed by Appellants, and use of the CCD camera as taught by Nishikawa is different than the camera use claimed by Appellants as well.

5. Claims 21-29 and 33-35 improperly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki.

Claims 21-29 and 33-35:

In the final Office Action, claims 21-29 and 33-35 all stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki. For many of the reasons set forth hereinabove with regard to independent claim 1 (see Argument to Issue 1 hereinabove),

however, Appellants respectfully maintain that rejection of independent claim 21 is improper and that claim 21 is not rendered obvious by Bauer and Suzuki.

In addition, since claims 22-29 and 33-35 are all dependent on independent claim 21, Appellants further maintain that claims 22-29 and 33-35 are not rendered obvious by Bauer and Suzuki as well. Furthermore, for purposes of this appeal, Appellants maintain that independent claim 21 does not necessarily stand or fall together with independent claim 1.

6. Claims 30-32 improperly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of Griessbach.

Claims 30-32:

Claims 30-32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bauer in view of Suzuki and in further view of Griessbach. For the reasons set forth hereinbelow, Appellants respectfully maintain that such rejections are improper.

Appellants, first of all, maintain that there is no motivating suggestion in Bauer, Suzuki, or Griessbach for their combination and the needed modification thereof to arrive at Appellants' invention in claims 30-32. Next, Appellants maintain that claims 31 and 32 are nonobvious over Bauer, Suzuki, and Griessbach for generally the same or similar reasons that analogous claims 11 and 12 are deemed nonobvious. (See Argument to Issue 2 hereinabove).

In sum, therefore, Appellants respectfully maintain that claims 30-32 are not rendered obvious by Bauer, Suzuki, and Griessbach and that rejection of claims 30-32 is thus improper. Furthermore, for purposes of this appeal, Appellants maintain that claims 31-32 do not necessarily stand or fall together with claims 11-12.

VIII. Claims Appendix

A copy of the claims involved in this appeal, namely claims 1-35, is attached herewith as a Claims Appendix.

IX. Evidence Appendix

None.

X. Related Proceedings Appendix

None.

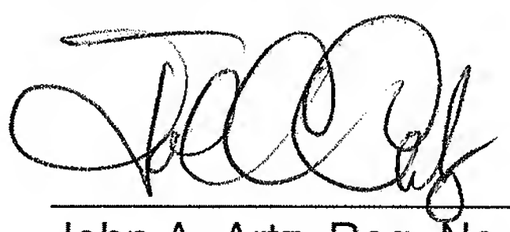
XI. Conclusion

For the foregoing reasons, Appellants respectfully request that the Board direct the Examiner in charge of examination of Appellants' Application to withdraw all standing rejections.

Please charge any fees required in the filing of this appeal to deposit account 06-1510.

Respectfully submitted,

ARTZ & ARTZ, P.C.



John A. Artz, Reg. No. 25,824
28333 Telegraph Road, Suite 250
Southfield, MI 48034
telephone: (248) 223-9500
facsimile: (248) 223-9522

Date: 10/13/06

CLAIMS APPENDIX

1. A control system for an automotive vehicle comprising:

a camera-based vision system generating image signals;

a rollover control system; and

a controller coupled to the camera system and the rollover control system, said controller generating a dynamic vehicle characteristic signal in response to the image signals, said controller controlling the rollover control system in response to the dynamic vehicle control signal.

2. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a vehicle roll direction angle signal.

3. A control system as recited in claim 1 further comprising a yaw control system, wherein said controller chooses between the yaw stability control system or the rollover control system in response to the dynamic vehicle characteristic.

4. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a vehicle pitch angle signal.

5. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a lateral velocity signal.

6. A control system as recited in claim 5 wherein said controller determines an aggressive driving status or loss of control status in response to the lateral velocity signal, said controller activating a yaw stability control system or a rollover control system in response to determining the aggressive driving status or loss of control status.

7. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a longitudinal velocity signal.

8. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a road departure signal.

9. A control system as recited in claim 8 further comprising a yaw stability control signal, said controller controlling the yaw stability control system in response to the road departure signal.

10. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises an in-path object signal.

11. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a wheel lifted signal.

12. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a body-to-road angle signal.

13. A control system as recited in claim 12 wherein the controller enters a wheel lift determination when the body-to-road angle is above a predetermined threshold.

14. A control system as recited in claim 1 further comprising generating a plurality of wheel speeds from a wheel speed sensors, wherein said controller identifying a wheel slip condition or wheel lock condition, said controller generating a longitudinal speed signal from the dynamic vehicle characteristic signal during the wheel slip or wheel lock condition.

15. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a body side slip signal.

16. A control system as recited in claim 1 wherein the dynamic vehicle characteristic signal comprises a rotational moment of inertia signal

17. A control system as recited in claim 1 wherein the camera system comprises a stereo pair of cameras.

18. A control system as recited in claim 1 wherein the camera system comprises a front camera and side camera.

19. A control system as recited in claim 1 wherein the camera system comprises a

rear camera and side camera.

20. A control system as recited in claim 1 further comprising a radar, lidar, or sonar-based system generating environmental sensing signals; and said controller generating a dynamic vehicle characteristic signal in response to the image signals and the environmental sensing signals.

21. A method of controlling a rollover control system of automotive vehicle comprising:

generating an image signal;

generating a dynamic vehicle characteristic signal in response to the image signal; and

controlling the rollover control system in response to the dynamic vehicle control signal.

22. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating a vehicle roll direction angle signal.

23. A method as recited in claim 21 further comprising a yaw control system, choosing between the yaw stability control system or the rollover control system in response to the dynamic vehicle characteristic signal.

24. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating a vehicle pitch angle signal.

25. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating a lateral velocity signal.

26. A method as recited in claim 25 further comprising determining an aggressive driving status or loss of control status in response to the lateral velocity signal, said controller activating a yaw stability control system or a rollover control system in response to determining the aggressive driving status or loss of control status.

27. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating a longitudinal velocity signal.

28. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating a road departure signal.

29. A method as recited in claim 28 further comprising a yaw stability control signal, said further comprising controlling the yaw stability control system in response to the road departure signal.

30. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating an in-path object signal.

31. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating a wheel lifted signal.

32. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating a body-to-road angle signal.

33. A method as recited in claim 21 further comprising entering a wheel lift determination when the body-to-road angle is above a predetermined threshold.

34. A method as recited in claim 21 further comprising generating a plurality of wheel speeds from a wheel speed sensors, identifying a wheel slip condition or wheel lock condition, generating a longitudinal speed signal in response to the dynamic vehicle characteristic signal during the wheel slip or wheel lock condition.

35. A method as recited in claim 21 wherein generating a dynamic vehicle characteristic signal comprises generating a body side slip signal.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.